



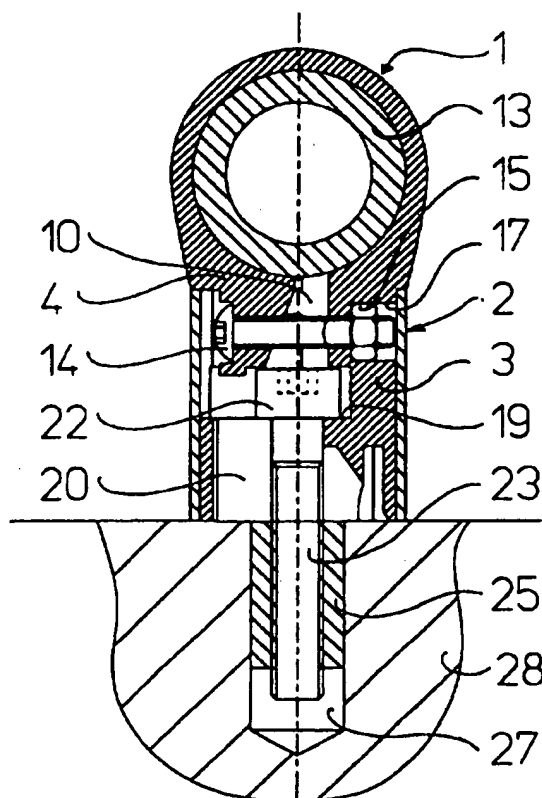
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/DK96/00114 <b>(22) International Filing Date:</b> 22 March 1996 (22.03.96)  <b>(30) Priority Data:</b> 0304/95                      24 March 1995 (24.03.95)                      DK  <b>(71) Applicant (for all designated States except US):</b> PRESSALIT A/S [DK/DK]; Skanderborgvej 96, DK-8680 Ry (DK).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> ØLLGÅRD, Nis [DK/DK]; Heibergsgade 1 C, DK-8000 Århus C (DK). RASMUSSEN, Hanne [DK/DK]; Thomas Thårupsvej 22, DK-8230 Åbyhøj (DK).  <b>(74) Agent:</b> CHAS. HUDE A/S; H.C. Andersens Boulevard 33, DK-1553 Copenhagen V (DK).		<b>(81) Designated States:</b> JP, NO, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Danish).</i>

**(54) Title:** A DEVICE FOR SECURING A RAIL ONTO A SUPPORTING STRUCTURE SUCH AS A WALL

**(57) Abstract**

A device for securing a rail (13) to a supporting structure such as a wall (28) comprises a slitted ring member (1) adapted to circumscribe the rail (13) in a retaining manner. On each side of the slit, the ring member (1) is provided with a projecting leg (3, 4). Moreover, the device is provided with a clamping means in form of a screw (14) and a nut (15) adapted to clamp the legs (3, 4) together, thus retaining the ring member (1) in engagement with the rail (13). The ring member (1) is of such a flexibility that it can be expanded to receive the rail through the slit. The device further comprises a fastening means in form of a screw (23) to secure the device to a supporting structure.



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Title: A device for securing a rail onto a supporting structure such as a wall.

### Technical Field

The invention relates to a device for securing bars and rails such as hand rails and the like onto a supporting structure such as a wall. A typical example of the use of  
5 the present invention is securing of hand rail structures in housing for the elderly and the like residential homes, for instance in corridors and bath rooms.

More specifically the invention relates to a device for securing a rail onto a supporting structure such as a wall and comprising a slitted ring member adapted to circumscribe the rail in a retaining manner and provided with a protruding leg on each side  
10 of the slit, and a clamping means adapted to clamp the legs together and thus retaining the ring member in engagement with the rail.

### Background Art

DE 36 04 326 discloses a device of the above type which adjacent the outer ends of the legs is provided with a recess adapted to be brought into retaining engagement  
15 with the head of a screw screwed into a wall when the legs and thus the ring member are clamped together by means of the transverse clamping means formed of a screw/nut connection. The legs of the ring member are clamped to the fastening members at the same as the ring member is clamped around the rail. This causes the device to be sensitive to the tolerances of the rail. Moreover, the ring member is  
20 made of a comparatively rigid material such as aluminium, for which reason it is necessary to insert the ring member onto the rail from one of end thereof.

Furthermore, US-A-1,096,282, US-A-2,896,899, US-A-3,023,992 and FR-A-1.104.928 all disclose various types of devices for securing rails onto a wall. These devices are however, all encumbered with various drawbacks, e.g. they comprise  
25 a comparatively large number of parts, are difficult to mount or have very limited applications.

### Brief Description of the Invention

The object of the invention is to provide a device of the above type of a simple structure and which is easy to mount and has many applications.

The device according to the invention is characterised in that the ring member is  
5 formed integrally of plastic and of such a flexibility that it may be expanded to receive the rail through the slit and that the device further comprises a fastening member for securing the device onto the supporting structure through a first leg.

As a result, many advantages as regards mounting is obtained, as the ring members of all of the devices necessary to support a rail can be secured to the supporting  
10 structure by means of the intended fastening means and the rail subsequently connected to the ring members by expanding the ring members, inserting the rail into the ring members through the slit and subsequently tightening the clamping means. Furthermore, due to the flexible ring member, devices may be mounted subsequently without dismounting the complete rail, if additional devices are needed  
15 to fasten the rail securely. Finally, the device is of a very simple structure and may be mass produced rationally by injection moulding the ring member in its expanded position. In this connection it should be noted that it might be advantageous immediately after the ring member has been moulded in its open position to bring this into a position corresponding essentially to the engagement position with the rail.  
20 Moreover, it is preferable that the ring member is of such a flexibility that it may be expanded such that the legs are essentially perpendicular to each other. As a result, the subsequent mounting of an additional device between two devices supporting a secured rail is facilitated.

In a particularly simple embodiment of the invention, the first leg is provided with  
25 an axial hole opening into an outer end face of the leg and adapted to receive a fastening means comprising a screw, which is passed through the axial hole from its end situated opposite the outer end of the leg. The device is thus mounted on the wall by screwing the screw into the wall.

In a second embodiment of the invention, the fastening means comprises a thread situated adjacent the axial hole. Thus in effect the device can be fastened to the wall by screwing a screw having a protruding threaded portion into the wall and bringing the thread situated adjacent the axial hole into engagement with the threaded portion.

- 5 The ring member of the device is secured to the wall by turning said member.

According to the invention, in the side the first leg may be provided with a first recess to receive the second leg, the second leg thus being within the outer outline of the first leg. Preferably, this recess communicates with the interior of the ring member. Moreover, it is preferable that the two legs have co-acting guide means to  
10 guide said legs into the position in which the ring member circumscribes the rail in a retaining manner.

Further, according to the invention, a second recess may be provided in the side of the first leg more closely to the outer end of said leg than the first recess and adapted to receive a screw head or a nut and communicating with the axial hole and  
15 that an abutment face for the screw head or the nut may be arranged around the opening of the axial hole in the second recess.

Moreover, according to the invention, the two recesses may be provided on the same side of the leg, one recess continuing axially into the other. This embodiment of the invention is particularly advantageous when the fastening means is formed of  
20 a hexagon socket head screw, as it thus is possible axially through the recesses to bring an Allen key into engagement with the socket hexagon of the screw in the open position of the ring member.

Furthermore, according to the invention, the second recess may be provided with inner surfaces adapted to prevent a head of a hexagon head screw or a hex-nut from  
25 turning. As the head of a hexagon socket screw may be inscribed into the head of a hexagon head screw of the same size and thus also into the corresponding nut, this embodiment of the invention renders many options in the choice of fastening means. Moreover, according to the invention, the legs may jointly have an essentially

- circular, cylindrical outer outline. Especially, one of the legs per se may have an essentially circular, cylindrical outline. A covering sleeve may be pivotally arranged around the legs and provided with an opening allowing one of the legs to pass herethrough. This embodiment of the invention is particularly preferable when the
- 5 second leg is received in a recess in the first leg, the recess and the leg received therein being concealable by rotation of the sleeve. The advantage of using a pivotal sleeve to conceal the recess instead of a plug being inserted into the recess is that a pivotal sleeve in contrast to a plug is not lost, if it becomes loose and is further secured against unwarranted removal.
- 10 Furthermore, according to the invention, the device may further comprise a flange member secured to the outer end of the first leg and provided with screw holes for screws to fasten the flange member and thereby the device to the supporting structure. In this embodiment a particularly reliable fastening to the supporting structure is obtained due to the flange member.
- 15 Finally, according to the invention the flange member may be of an essentially rotationally symmetric shape and the screw holes may be arranged on a circle being concentric with the flange member, and an annular cover may be pivotally arranged on the flange member, said cover at least covering the screw holes and provided with an opening of such a size that the heads of the screws may pass herethrough.
- 20 At the mounting of the screws, the opening of the cover is turned so as to be in alignment with the hole in which the screw is to be mounted. When all of the screws have been mounted, the opening is turned away from the holes, whereby these are covered. Compared to conventional covering means, the annular cover has the above advantages of the sleeve for covering a recess in the leg.

25 Brief Description of the Drawings.

The invention is explained in detail below with reference to the drawings, in which

Fig. 1 is an exploded view of a first embodiment of the device according to the

invention, seen isometrically.

Fig. 2 is a top view of the device shown in Fig. 1 utilised to secure a rail onto a wall.

Fig. 3 is a sectional view taken along the line III-III of Fig. 2,

5 Fig. 4 is a sectional view corresponding to Fig. 3 of a ring member of the device shown in Figs. 1 to 3 in the position in which it is moulded,

Fig. 5 is an isometric, exploded view of a second embodiment of the device according to the invention, and

Fig. 6 is an isometric, exploded view of a third embodiment of the device accord-  
10 ing to the invention.

#### Best Mode for Carrying Out the Invention

The embodiment of the device according to the invention shown in Figs. 1 to 4 comprises a slitted ring member 1 and a cylindrical sleeve 2. The ring member 1 is injection moulded in plastic into the form shown in Figs. 1 to 4, wherein it is  
15 provided with a comparatively wide slit. The ring member is provided with a first outwardly projecting leg 3 on one side of the slit and with a second outwardly projecting leg 4 on the other side of the slit. The second outwardly projecting leg 4 is provided with a shank 5 continuing into a head 6, two guide faces 7,8 being formed between the shank and the head. The head 6 is provided with a countersunk,  
20 through-hole 9.

The first projecting leg 3 has an essentially cylindrical outer outline. On the side facing the second leg 4, the first leg 3 is provided with a first recess 10 being open towards the slit and adapted to receive the second leg 4. The recess 10 is provided with mutually opposing guide faces 11, 12 adapted to co-act with the guide faces 8,7

of the second leg, when the legs are pressed together to adopt the position shown in Figs. 2 and 3 in which the ring member essentially circumscribes the rail or tube 13. The ring member 1 is retained in the shown retaining and circumscribing position by means of a hexagon socket screw 14 extending through the hole 9 and  
5 engaging a nut 15 accommodated in a countersunk hole 17 on the outer face of the first leg 3. In the position in which the ring member retains the rail the slit is comparatively narrow.

The first recess 10 continues into a second recess 18 which is also open in the side of the first leg 3 facing the second leg 4. Via a ledge 19, the second recess 18  
10 continues into an axial hole 20 opening into the plane outer surface 21 of the first leg. The second recess 18 is adapted to receive the head 22 of a screw 23 having an inner hexagon head and a shank 24 extending through the axial hole 20 into engagement with an expansion bushing 25 provided in a hole 27 in the wall 28. The ledge 19 between the second recess 18 and the axial hole 20 serves as an abutment  
15 face for the screw head 22. In a sectional view, the axial hole is oblong, its largest dimension being in the direction of the opening of the second recess 18 in the side of the first leg 3 and increasing towards the end face 21. As a result, the insertion of the screw 23 into the axial hole 20 and the recess 18 is facilitated. The screw 23 is fastened by means of an Allen key.

20 The ring member 1 is made of plastic by injection moulding and comprises such a flexibility that it can be expanded to receive the tube 13 through the slit, i.e. expanded in relation to the moulding position shown in Figs. 1 and 4, as well as clamped together in the retaining position shown in Figs. 2 and 3 in which it is in retaining engagement with the tube 13. It is particularly preferable that the ring  
25 member 1 can be expanded to the position indicated in Fig. 4 by a dotted line, whereby the ring member 1 may be moved into engagement with the tube 13 with that the first leg 3 perpendicular to the surface of a supporting structure. As a result, it is possible to subsequently mount an additional device between two devices supporting a previously secured tube 13.



The cylindrical sleeve 2 is adapted to circumscribe the first leg 3 and at one end provided with an opening 29 of such a size that the second leg 4 may pass here-through, when the legs 3,4 of the ring member 1 are pressed and clamped together.

When the two legs have been clamped together, the opening 29 of the sleeve 2 is  
5 turned away from the recess 10 such the wall of the sleeve 2 covers said recess.

Finally, it should be noted that the second recess 18 is provided with two opposing side faces 30,31 interspaced essentially corresponding to the span of the jaws of a hexagon head screw or a nut of the same dimension as the screw 23. The hexagon head screw or the nut may thus be retained and prevented from turning in the  
10 second recess 18. The sleeve 2 is made of injection moulded plastic.

The device shown in Figs. 1 to 4 is mounted by arranging the sleeve 2 on the first leg 3 and subsequently mounting the ring member 1 onto the wall 28 by screwing the screw 23 therein. The ring member may thus be expanded such that the tube can be received herein through the slit as a result of the high flexibility of the ring  
15 member. The ring member is pressed together and brought into retaining engagement with the tube 13 by screwing the screw 14 into the nut 15. As a last measure, the sleeve 2 is turned to cover the recesses 10 and 18 in the first leg 3.

The embodiment of the device according to the invention shown in Fig. 5 comprises a ring member 101, a sleeve 102, a flange member 40 and an annular cover 41 for  
20 the flange member 40. The ring member 101 essentially corresponds to the ring member 1 described with reference to Figs. 1 to 4, apart from additionally comprising four cylindrical projections (not shown) extending axially from the end face 21. Instead of the screw 23, a nut 42 is accommodated in the recess 18 and prevented from turning by the two opposing side faces 30 and 31 of the recess 18. In all other  
25 aspects the ring member 101 is identical to the ring member 1, for which reason no further description thereof is rendered. The same applies to the sleeve 102 which is completely identical to the sleeve 2.

The flange member 140 is essentially shaped as a circular disk with a slightly

conical upper surface 43 in which four oval countersunk screw holes 44 are provided and equally interspaced on a circle. A projecting oval knob 45 is provided between two of the holes on the same circle. Eight circular holes 46 are provided equally interspaced on a circle having a diameter smaller than the circle for the oval  
5 holes 44. Interior of these holes, the flange member is provided with a circular recess 47 of a diameter corresponding to the outer diameter of the sleeve 102. At the bottom of the recess 47 eight circular holes 48 are provided equally interspaced on a circle. The diameter of the holes 48 corresponds to the diameter of the circular projections on the outer end face 21 of the ring member 101 and the projections are  
10 arranged on a circle as the circular holes 48 and spaced corresponding to every second hole. The projections are adapted to engage the holes 48 to determine the angular position of the ring member 101 relative to the flange member 40. Finally, the flange member 40 is provided with a central through-bore 49 countersunk on the rear face 50 of the flange member 40, a screw 51 having a countersunk head  
15 extending through the bore 49 to engage the nut 42 in the ring member 3.

The annular cover 41 is formed so as to cover the outer face of the flange member 40 and provided with an oblong opening 52 of the same shape and arranged on the same pitch circle as the knob 45 on the flange member 40. Moreover, the cover 41 has a central hole 43 of a diameter corresponding to the outer diameter of the sleeve  
20 102. Finally, the cover 41 is provided with a backwards facing projection 53 dimensioned and arranged to engage the holes 46 in the flange member 40. When the backward facing projection 53 is accommodated in the hole 46a, the knob 45 on the flange member 40 is received in the opening 52 of the cover 41 and the cover is retained in a covering position on the flange member 40, the holes 44,46 thus  
25 being covered.

The embodiment of the device according to the invention shown in Fig. 6 is adapted to interconnect two tubes to form a so-called T-assembly. The device comprises a ring member 201, a sleeve 202 and an expansion member 60. The ring member 201 corresponds essentially to the ring member 1, and is thus provided with four circular  
30 projections as the ring member 101, said projections extending from the end face

21 and arranged in the same manner as the projections on the ring member 101 described with reference to Fig. 5. In this connection it should be noted that the projections are arranged such in relation to the inside diameter of the tube or tubes which the device is to fasten that when inserted into the end of the tube, the projections essentially abut the inner face of the tube and thus serve to align the ring member 201 in relation to the rail. Moreover, the first leg 203 of the ring member 201 is slightly shorter than the first leg 3 of the ring member 1, the distance between the end face 21 and the abutment face 19 being shortened. In every other respect, the ring member 201 corresponds to the ring members 1 and 101. The ring member 201 is adapted to circumscribe and retain a first tube.

The sleeve 202 is provided with cylindrical inner surface 61 adapted to circumscribe the first leg 203 of the ring member 201 and continuing into a second short, cylindrical inner surface 62 of a larger diameter than the first cylindrical inner surface 61. said second surface 62 adapted to circumscribe the outer end of the second tube. The outer surface 63 of the sleeve 202 tapers from the short second cylindrical inner surface 62 towards the outer end of the first inner cylindrical surface 61.

The expansion member 60 comprises a slotted, expansible outer bushing 64 provided with a longitudinal slit 65 and an inner bushing having a cylindrical outer surface 74 and a slightly conical inner surface 75 provided with annular grooves. The inner bushing is adapted to be received in the outer bushing 64 and comprises two bushing halves 66,67 which jointly comprise a slightly conical outer surface 68 of essentially the same angle of taper as the inner surface 75 of the outer bushing 64. Moreover, on the cylindrical surface the bushing half 67 is provided with a knob 69 adapted to be received in the slit 65 of the outer bushing. A mutual turning of the two bushings is thus prevented. A nut 70 is secured against turning and retained in a recess 71 in each of the bushing halves 66,67.

By inserting the expansion member 60 into the second tube and bringing the screw 22 into engagement with the nut 70 in the assembled state of device, the inner

bushing is drawn towards the ring member 201 and the outer bushing 64 is expanded to interlockingly engaging the inner surface of the second tube.

Claims

1. A device for securing a rail (13) to a supporting structure such as a wall (28) and comprising a slitted ring member (1, 101, 201) adapted to circumscribe the rail in a retaining manner and provided with a projecting leg (3,4) on each side of the slit and a clamping means (14,15) adapted to the clamp the legs together, thus retaining the ring member in engagement with the rail, characterised in that the ring member (1, 101, 201) is formed integrally of plastic and of such a flexibility that it may be expanded to receive the rail (13) through the slit and that the device further comprises a fastening means for securing said device to the supporting structure through a first leg (3).
2. A device as claimed in claim 1, characterised in that the first leg (3) is provided with an axial hole (20) opening into an outer end face (21) of the leg and adapted to receive a fastening means comprising a screw (23).
3. A device as claimed in claims 1 or 2, characterised in that the fastening means comprises a thread situated adjacent the axial hole (20).
4. A device as claimed in claim 1, characterised in that the first leg (3) is provided with a first recess (10) to receive the second leg (4).
5. A device as claimed in claim 4, characterised in that a second recess (18) is provided in the side the first leg (3) more closely to the outer end (21) of the leg than the first recess (10) and adapted to receive a screw head or a nut and communicating with the axial hole (20) and that an abutment face (19) for the screw head or the nut is provided around the opening of the axial hole in the second recess (18).
6. A device as claimed in claims 4 and 5, characterised in that the recesses (10,18) are provided on the same side of the first leg (3), one recess continuing axially into the other.

7. A device as claimed in claims 5 or 6, characterised in that the second recess (18) is provided with inner surfaces (30,31) adapted to prevent a head of a hexagon head screw or a hex-nut from turning.

5 8. A device as claimed in one or more of the preceding claims, characterised in that the legs (3,4) jointly have an essentially circular cylindrical outer outline and that a sleeve (2,102,202) is pivotally arranged around said legs and provided with an opening (29) in its wall, said opening allowing one of the legs (4) to pass herethrough.

10 9. A device as claimed in one or more of the preceding claims, characterised in that it further comprises a flange member (40) secured to the outer end (21) of the first leg (3) and provided with screw holes (44) for screws to fasten the flange member and thus in effect the device to the supporting structure.

10. A device as claimed in claim 9, characterised in that the flange  
15 member is of an essentially rotationally symmetrical shape and that the screw holes (44) arranged in a pitch circle being concentric with the flange member and that an annular cover (41) is pivotally arranged on the flange member, said cover at least covering the screw holes (44) and provided with an opening (52) of such a size that the heads of the screws may pass herethrough.

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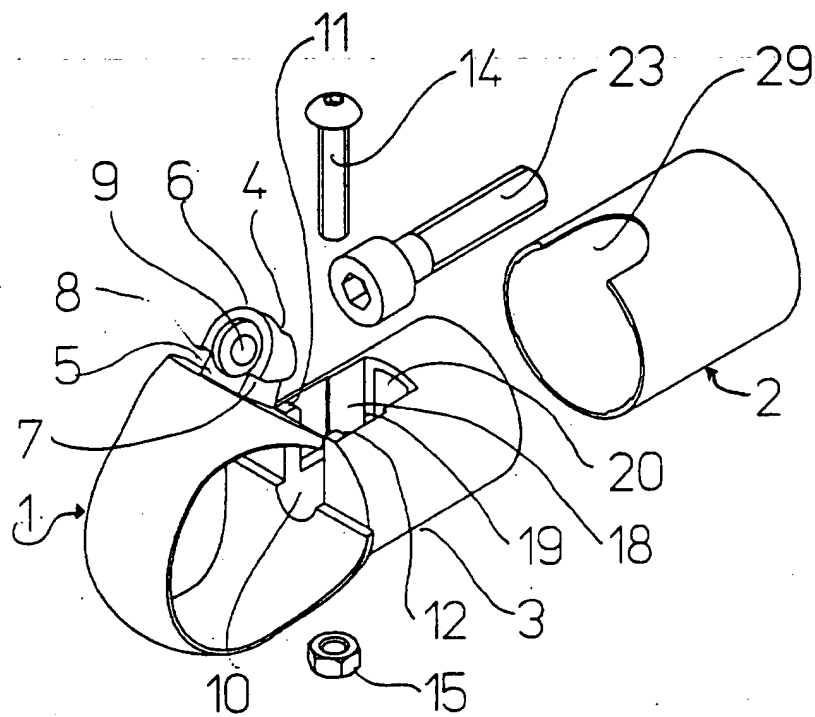


FIG. 1

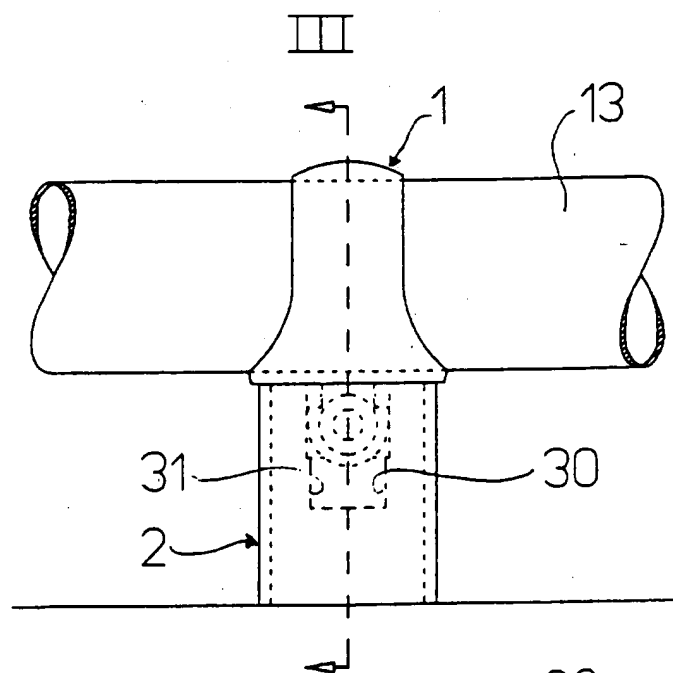


FIG. 2

III

28

2/4

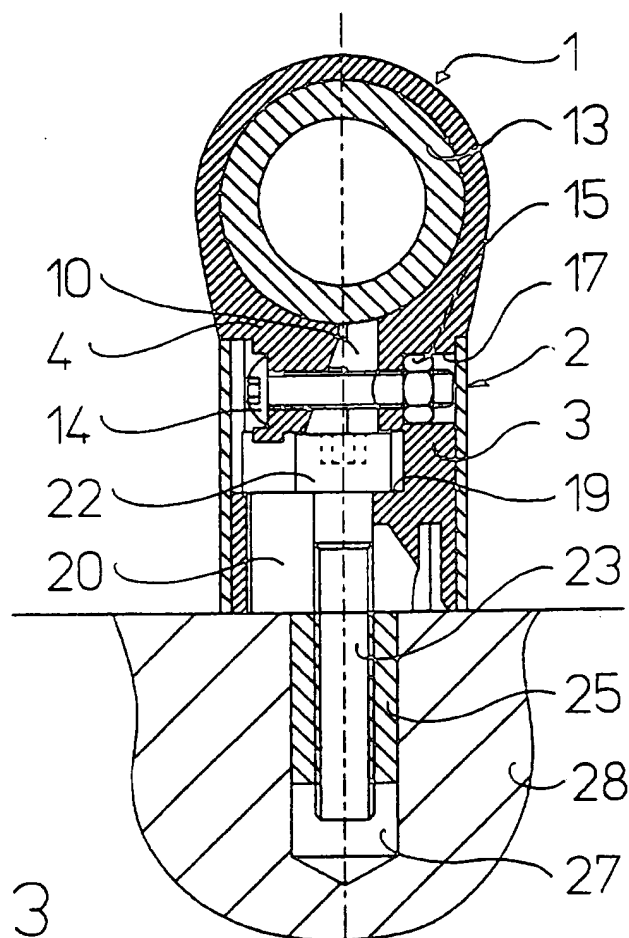


FIG. 3

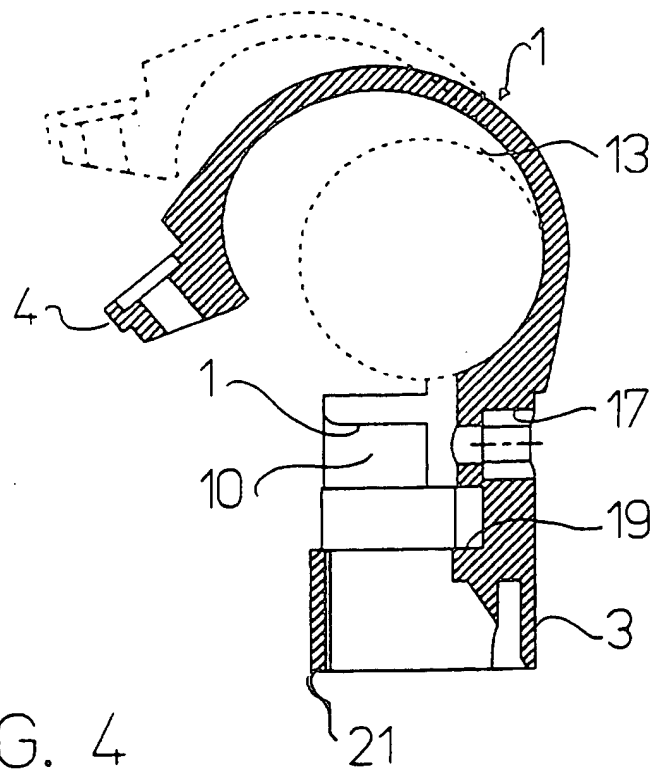


FIG. 4



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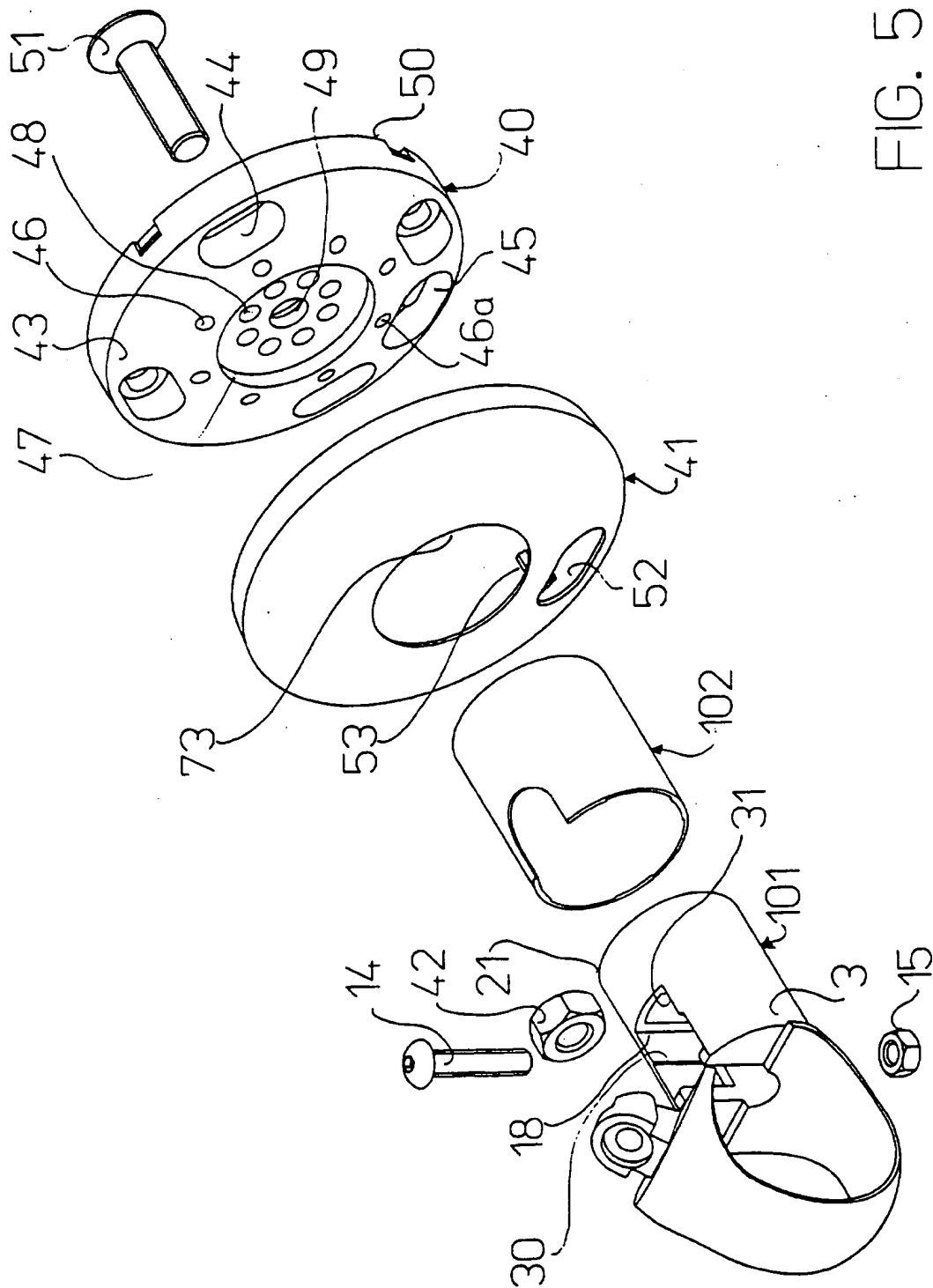


FIG. 5

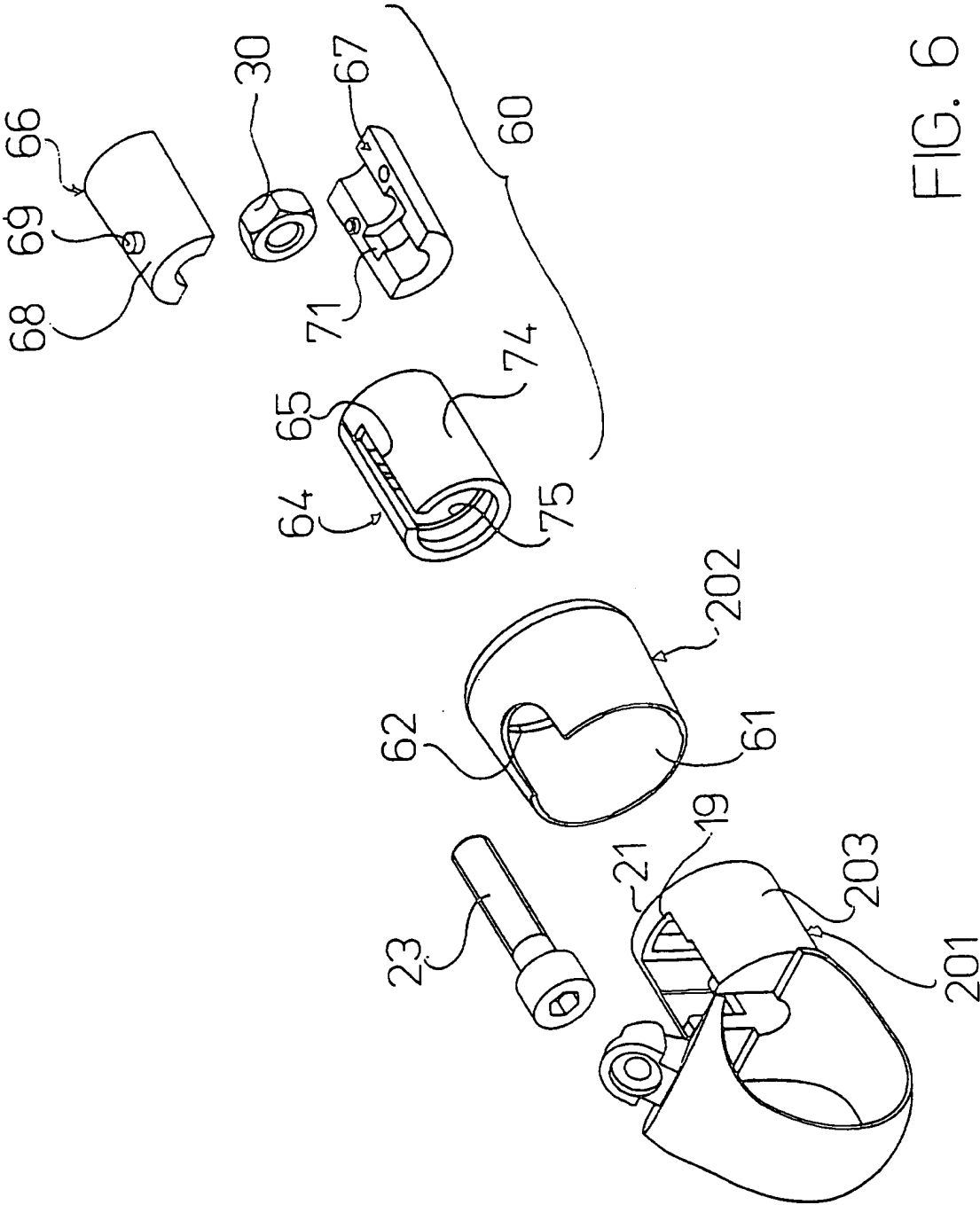


FIG. 6

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 96/00114

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: F16B 2/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: F16B, F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1261202 A (RONALD EDMONSON), 26 January 1972 (26.01.72), page 1, line 34 - line 36; page 2, line 7 - line 14, figure 2, figure 3 --	1,2
X	DK 94704 A (HANS ANDERS PEDERSEN), 5 November 1962 (05.11.62), page 1, line 40 - line 47, figure 1 --	1
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A	US 2896899 A (WILLIAM J. RONAN), 28 July 1959 (28.07.59) -----	1,3,8,9

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

01/04/96

International application No.  
PCT/DK 96/00114

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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DK-A-	94704	05/11/62	NONE		
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